

REMARKS

Claims 1-16 and 25 currently are pending.

Restriction Requirement

The examiner acknowledged the election with traverse of Group I (claims 1-16) but still deemed the requirement proper. Therefore, applicants cancel claims 18-24 which are drawn to an invention nonelected with traverse.

Sequence Disclosure

The examiner has required that the primers located on page 18 of the specification be included in a sequence disclosure. Therefore, applicants submit herein a revised sequence disclosure which includes the primers located on page 18 of the specification.

A copy of the Sequence Listing in computer readable form is attached hereto. The content of the paper copy of the Sequence Listing and the copy of the Sequence Listing in computer readable form is the same, and includes no new matter. It is believed that by submitting the present amendment and sequence listing diskette, the application now fully complies with the requirements of 37 CFR 1.821-1.825. Favorable action by the examiner is solicited.

Foreign Priority

Applicants soon will submit a certified translation of German patent (1970066.9) for proper claiming of priority under 35 USC § 119(a)-(d).

Arrangement of the Specification

As required by the examiner applicants insert proper headings in the specification.

35 USC § 112, first paragraph (Enablement)

The examiner rejected claims 1-16 because the specification while enabling for a DNA sequence encoding a hydroxyphenylpyruvate dioxygenase (HPPD) isolated from barley, an expression vector comprising said isolated DNA sequence, a method of transforming comprising said expression cassette and a plant transformed therewith, does not reasonably provide enablement for other plant DNA sequences encoding an HPPD or uses thereof.

To overcome the rejection applicants amend claim 1 so that it is directed to an isolated DNA sequence encoding a barley HPPD. This amendment is supported by the specification on page 7, line 26. Applicants also add new claim 25, which depends on claim 1.

35 USC § 112, second paragraph (Indefiniteness)

Applicants follow the examiner's suggestions and amend the claims accordingly. Claim 6 has been amended to a process claim which comprises a definite step.

35 USC §102/§ 103

The examiner rejected claim 1 under 35 USC § 102(b) as being anticipated by the intervening reference Krupinska et al. because it discloses SEQ ID NO: 1.

Applicants will soon submit a copy of the a translation of the priority application which should overcome this rejection.

Claims 1-13, 5-12, 14 and 16 were rejected under 35 USC § 102(e) as being anticipated by Della Penna et al. (US 6,087,563). Claims 4, 13 and 15 were rejected as being obvious under 35 USC § 103(a) over Della Penna et al. Applicants first point out that claim 1 as amended is not disclosed by Della Penna et al. as this reference does

not disclose a barley HPPD. Furthermore, applicants herein submit a declaration signed by Dr. Jon Falk who has established new data and summarized the already present data. Kindly consider the arguments in the declaration.

For the reasons expressed above, it is urged that the prior art references cited by the examiner either singly or in combination fail to anticipate or suggest the present invention as defined by the amended claims. Accordingly, a *prima facie* case of obviousness has not been established by the examiner, and the rejection under 35 USC § 103 should be withdrawn.

A check in the amount of \$400.00 is attached to cover the required two month extension of time fee.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Cancel claims 18-24.

Amend claims 1-14 and add new claim 25 as follows:

1. (amended) [The] An isolated DNA sequence encoding barley [SEQ ID NO:1 and DNA sequences hybridizing therewith, encoding an] HPPD.

2. (amended) An expression cassette comprising a promoter and [a] the DNA sequence as claimed in claim 1.

3. (amended) An expression cassette as claimed in claim 2, comprising [the] a CaMV 35S promoter.

4. (amended) An expression cassette as claimed in claim 2, comprising [the] a seed-specific phaseolin promoter.

5. (amended) An expression cassette as claimed in claim 2, further comprising the DNA sequence as claimed in claim 1 being functionally linked to another protein in such a way that a joint translation product is formed.

6. (amended) [The use of] A process for transforming plants comprising the step of incorporating into plants the expression cassette as claimed in claim 2 [for transforming plants].

7. (amended) A method of transforming a plant, which comprises introducing [an] the expression cassette as claimed in claim 2 into a plant cell, into callus tissue, into an entire plant or into plant cell protoplasts.

8. (amended) A method of transforming plants, which comprises
1) transferring the expression cassette as claimed in claim 2 into an agrobacterial

strain,

- 2) isolating the recombinant clones formed, and
- 3) [using the latter for transforming plants] transforming a plant with the isolated recombinant clones.

9. (amended) [A] The method as claimed in claim 8, the transformation being accomplished with the aid of the strain *Agrobacterium tumefaciens*.

10. (amended) [A] The method of transforming plants as claimed in claim 7, wherein the transformation is accomplished with the aid of electroporation.

11. (amended) [A] The method of transforming plants as claimed in claim 7, wherein the transformation is accomplished with the aid of the particle bombardment method.

12. (amended) A plant with an elevated vitamin E content, comprising [an] the expression cassette as claimed in claim 2.

13. (amended) [A] The plant as claimed in claim 12, selected from the group consisting of soya, barley, oat[s], wheat, oilseed rape, maize, [or] and sunflower[s].

14. (amended) A method of generating plants with an elevated vitamin E content, which comprises expressing, in plants, [a] the DNA sequence as claimed in claim 1.

25. (new) An isolated DNA sequence as claimed in claim 1, comprising the sequence SEQ ID NO: 1.

COPY OF ALL CLAIMS

1. (amended) An isolated DNA sequence encoding barley HPPD.
2. (amended) An expression cassette comprising a promoter and the DNA sequence as claimed in claim 1.
3. (amended) An expression cassette as claimed in claim 2, comprising a CaMV 35S promoter.
4. (amended) An expression cassette as claimed in claim 2, comprising a seed-specific phaseolin promoter.
5. (amended) An expression cassette as claimed in claim 2, further comprising the DNA sequence as claimed in claim 1 being functionally linked to another protein in such a way that a joint translation product is formed.
6. (amended) A process for transforming plants comprising the step of incorporating into plants the expression cassette as claimed in claim 2.
7. (amended) A method of transforming a plant, which comprises introducing the expression cassette as claimed in claim 2 into a plant cell, into callus tissue, into an entire plant or into plant cell protoplasts.
8. (amended) A method of transforming plants, which comprises
 - 1) transferring the expression cassette as claimed in claim 2 into an agrobacterial strain,
 - 2) isolating the recombinant clones formed, and
 - 3) transforming a plant with the isolated recombinant clones.
9. (amended) The method as claimed in claim 8, the transformation being accomplished with the aid of the strain *Agrobacterium tumefaciens*.

10. (amended) The method of transforming plants as claimed in claim 7, wherein the transformation is accomplished with the aid of electroporation.

11. (amended) The method of transforming plants as claimed in claim 7, wherein the transformation is accomplished with the aid of the particle bombardment method.

12. (amended) A plant with an elevated vitamin E content, comprising the expression cassette as claimed in claim 2.

13. (amended) The plant as claimed in claim 12, selected from the group consisting of soya, barley, oat, wheat, oilseed rape, maize, and sunflower.

14. (amended) A method of generating plants with an elevated vitamin E content, which comprises expressing, in plants, the DNA sequence as claimed in claim 1.

15. A method as claimed in claim 14, wherein the DNA sequence is expressed in a tobacco plant.

16. A method as claimed in claim 14, wherein expression takes place in the leaves or the seeds of the plant.

25. (new) An isolated DNA sequence as claimed in claim 1, comprising the sequence SEQ ID NO: 1.

SEQUENCE LISTING

O I P E
FEB 14 2002
PATENTS TRADEMARKS REGISTRATION
<110> Seulberger, Harald
Lerchl, Jenms
Schmidt, Ralf-Michael
Krupinska, Karin
Falk, Jon

<120> DNA sequence encoding a hydroxyphenylpyruvate dioxygenase, and its overproduction in plants

<130> 0050/48141

<140> US 09/462,629
<141> 2000-01-11

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50

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Ala Ala Val Thr Pro Glu His Ala Arg Pro His Arg Met Val Arg Phe
15 20 25 30

98

aac ccg cgc agc gac cgc ttc cac acg ctc tcc ttc cac cac gtc gag
Asn Pro Arg Ser Asp Arg Phe His Thr Leu Ser Phe His His Val Glu
35 40 45

146

ttc tgg tgc gcg gac gcc tcc gcc ggc cgc ttc gcg ttc gcg
Phe Trp Cys Ala Asp Ala Ala Ser Ala Gly Arg Phe Ala Phe Ala
50 55 60

194

ctc ggc gcg ccg ctc gcc agg tcc gac ctc tcc acg ggg aac tcc
Leu Gly Ala Pro Leu Ala Ala Arg Ser Asp Leu Ser Thr Gly Asn Ser
65 70 75

242

gct cac gcc tcc cag ctg ctc cgc tcg ggc tcc ctc gcc ttc ctc ttc Ala His Ala Ser Gln Leu Leu Arg Ser Gly Ser Leu Ala Phe Leu Phe	290
80 85 90	
acc gct ccc tac gcc aac ggc tgc gac gcc acc gcc tcc ctg ccc Thr Ala Pro Tyr Ala Asn Gly Cys Asp Ala Ala Thr Ala Ser Leu Pro	338
95 100 105 110	
tcc ttc tcc gcc gac gcc gct cgg ttc tcc gcc gac cac ggg atc Ser Phe Ser Ala Asp Ala Ala Arg Arg Phe Ser Ala Asp His Gly Ile	386
115 120 125	
gct gtg cgc tcc gta gct ctc gtc gca gac gcc gag gcc ttc Ala Val Arg Ser Val Ala Leu Arg Val Ala Asp Ala Ala Glu Ala Phe	434
130 135 140	
cgc gcc agt cgt cga cgg ggc gct ccc gtc gac gcc ccc gtg gac Arg Ala Ser Arg Arg Arg Gly Ala Arg Pro Ala Phe Ala Pro Val Asp	482
145 150 155	
ctc ggc cgc ggc ttc gct ttc gct gag gtc gag ctc tac ggc gac gtc Leu Gly Arg Gly Phe Ala Phe Ala Glu Val Glu Leu Tyr Gly Asp Val	530
160 165 170	
gtg ctc cgc ttc gtc agc cac ccg gac ggc acg gac gtg ccc ttc ttg Val Leu Arg Phe Val Ser His Pro Asp Gly Thr Asp Val Pro Phe Leu	578
175 180 185 190	
ccg ggg ttc gag ggc gta acc aac ccg gac gcc gtg gac tac ggc ctg Pro Gly Phe Glu Gly Val Thr Asn Pro Asp Ala Val Asp Tyr Gly Leu	626
195 200 205	
acg cgg ttc gac cac gtc gtc ggc aac gtc ccg gag ctt gcc ccc gcc Thr Arg Phe Asp His Val Val Gly Asn Val Pro Glu Leu Ala Pro Ala	674
210 215 220	
gca gcc tac atc gcc ggg ttc acg ggg ttc cac gag ttc gcc gag ttc Ala Ala Tyr Ile Ala Gly Phe Thr Gly Phe His Glu Phe Ala Glu Phe	722
225 230 235	
acg gcg gag gac gtg ggc acg acc gag agc ggg ctc aac tcg gtg gtg Thr Ala Glu Asp Val Gly Thr Thr Glu Ser Gly Leu Asn Ser Val Val	770
240 245 250	
ctc gcc aac aac tcg gag ggc gtg ctg ctg ccg ctc aac gag ccg gtg Leu Ala Asn Asn Ser Glu Gly Val Leu Leu Pro Leu Asn Glu Pro Val	818
255 260 265 270	
cac ggc acc aag cgc cgg agc cag ata cag acg ttc ctg gaa cac cac His Gly Thr Lys Arg Arg Ser Gln Ile Gln Thr Phe Leu Glu His His	866
275 280 285	
ggc ggc ccg ggc gtg cag cac atc gct gtg gcc agc agt gac gtg ctc	914

Gly Gly Pro Gly Val Gln His Ile Ala Val Ala Ser Ser Asp Val Leu
 290 295 300

agg acg ctc agg aag atg cgt gcg cgc tcc gcc atg ggc ggc ttc gac
 Arg Thr Leu Arg Lys Met Arg Ala Arg Ser Ala Met Gly Gly Phe Asp
 305 310 315

962

ttc ctg cca ccc ccg ctg ccg aag tac tac gaa ggc gtg cga cgc ctt
 Phe Leu Pro Pro Leu Pro Lys Tyr Tyr Glu Gly Val Arg Arg Leu
 320 325 330

1010

gcc ggg gat gtc ctc tcg gag gcg cag atc aag gaa tgc cag gag ctg
 Ala Gly Asp Val Leu Ser Glu Ala Gln Ile Lys Glu Cys Gln Glu Leu
 335 340 345 350

1058

ggt gtg ctc gtc gat agg gac gac caa ggg gtg ttg ctc caa atc ttc
 Gly Val Leu Val Asp Arg Asp Asp Gln Gly Val Leu Leu Gln Ile Phe
 355 360 365

1106

acc aag cca gta ggg gac agg ccg acc ttg ttc ctg gag atg atc cag
 Thr Lys Pro Val Gly Asp Arg Pro Thr Leu Phe Leu Glu Met Ile Gln
 370 375 380

1154

agg atc ggg tgc atg gag aag gac gag aga ggg gaa gag tac cag aag
 Arg Ile Gly Cys Met Glu Lys Asp Glu Arg Gly Glu Glu Tyr Gln Lys
 385 390 395

1202

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 Gly Gly Cys Gly Phe Gly Lys Gly Asn Phe Ser Glu Leu Phe Lys
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1250

tcc att gaa gat tac gag aag tcc ctt gaa gcc aag caa tct gct gca
 Ser Ile Glu Asp Tyr Glu Lys Ser Leu Glu Ala Lys Gln Ser Ala Ala
 415 420 425 430

1298

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 Val Gln Gly Ser

1350

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1410

gaagctgaag acagatgtat cctatgtatg atgggtgtaa tggatggtag aggggctcac

1470

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1530

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1565

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 20 25 30

Arg Ser Asp Arg Phe His Thr Leu Ser Phe His His Val Glu Phe Trp
 35 40 45

Cys Ala Asp Ala Ala Ser Ala Ala Gly Arg Phe Ala Phe Ala Leu Gly
 50 55 60

Ala Pro Leu Ala Ala Arg Ser Asp Leu Ser Thr Gly Asn Ser Ala His
 65 70 75 80

Ala Ser Gln Leu Leu Arg Ser Gly Ser Leu Ala Phe Leu Phe Thr Ala
 85 90 95

Pro Tyr Ala Asn Gly Cys Asp Ala Ala Thr Ala Ser Leu Pro Ser Phe
 100 105 110

Ser Ala Asp Ala Ala Arg Arg Phe Ser Ala Asp His Gly Ile Ala Val
 115 120 125

Arg Ser Val Ala Leu Arg Val Ala Asp Ala Ala Glu Ala Phe Arg Ala
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Ser Arg Arg Arg Gly Ala Arg Pro Ala Phe Ala Pro Val Asp Leu Gly
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Arg Gly Phe Ala Phe Ala Glu Val Glu Leu Tyr Gly Asp Val Val Leu
 165 170 175

Arg Phe Val Ser His Pro Asp Gly Thr Asp Val Pro Phe Leu Pro Gly
 180 185 190

Phe Glu Gly Val Thr Asn Pro Asp Ala Val Asp Tyr Gly Leu Thr Arg
 195 200 205

Phe Asp His Val Val Gly Asn Val Pro Glu Leu Ala Pro Ala Ala Ala
 210 215 220

Tyr Ile Ala Gly Phe Thr Gly Phe His Glu Phe Ala Glu Phe Thr Ala
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Glu Asp Val Gly Thr Thr Glu Ser Gly Leu Asn Ser Val Val Leu Ala
 245 250 255

Asn Asn Ser Glu Gly Val Leu Leu Pro Leu Asn Glu Pro Val His Gly
 260 265 270

Thr Lys Arg Arg Ser Gln Ile Gln Thr Phe Leu Glu His His Gly Gly
 275 280 285

Pro Gly Val Gln His Ile Ala Val Ala Ser Ser Asp Val Leu Arg Thr
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Leu Arg Lys Met Arg Ala Arg Ser Ala Met Gly Gly Phe Asp Phe Leu
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Asp Val Leu Ser Glu Ala Gln Ile Lys Glu Cys Gln Glu Leu Gly Val
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Gly Cys Met Glu Lys Asp Glu Arg Gly Glu Glu Tyr Gln Lys Gly Gly
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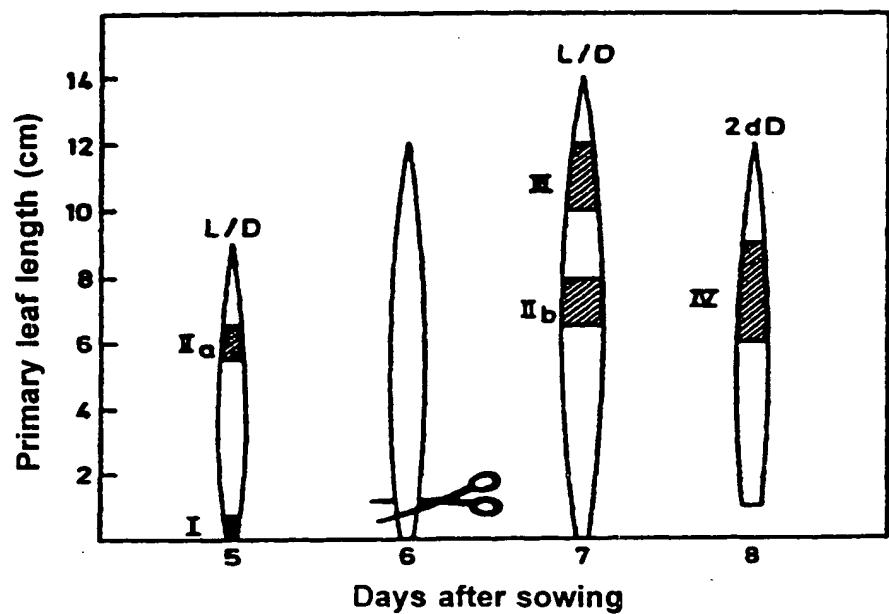
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10--

[1/7]

FIG. 1

[Fig. 1/7]



[2/7]

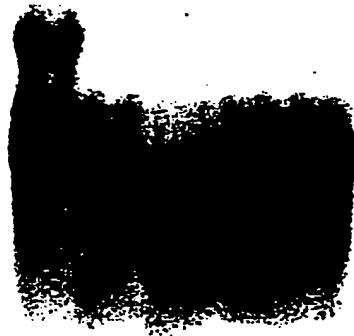
FIG. 2

[Fig. 2/7]

I IIa IIb III IV

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1600 nt →

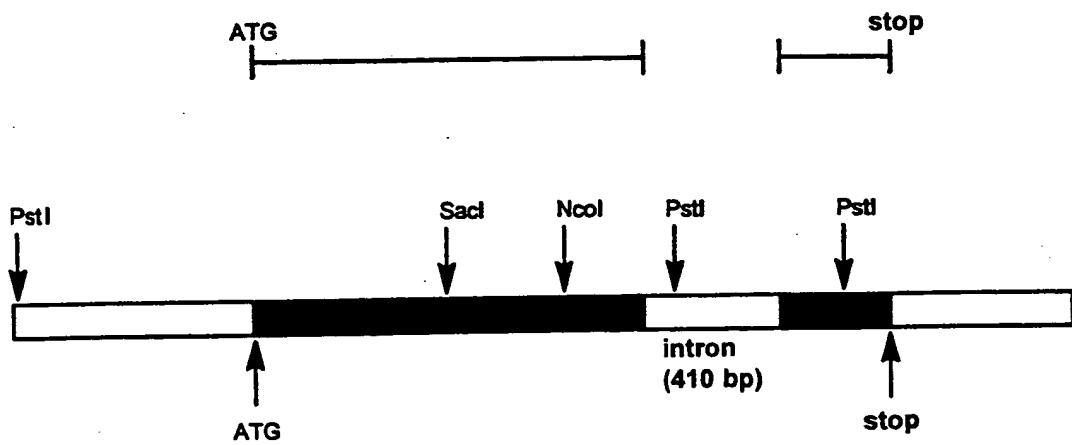


[3/7]

FIG. 3

[Fig. 3/7]

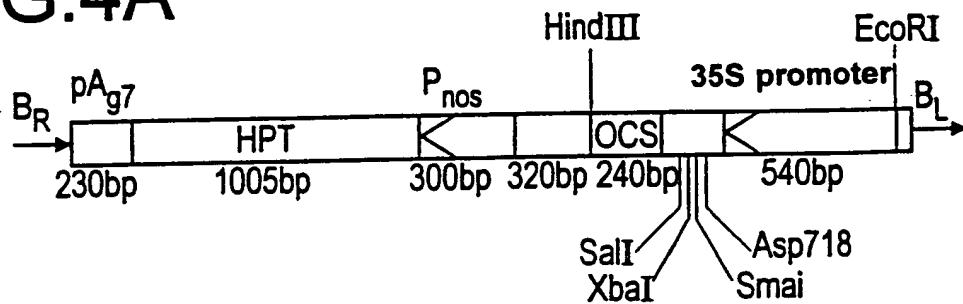
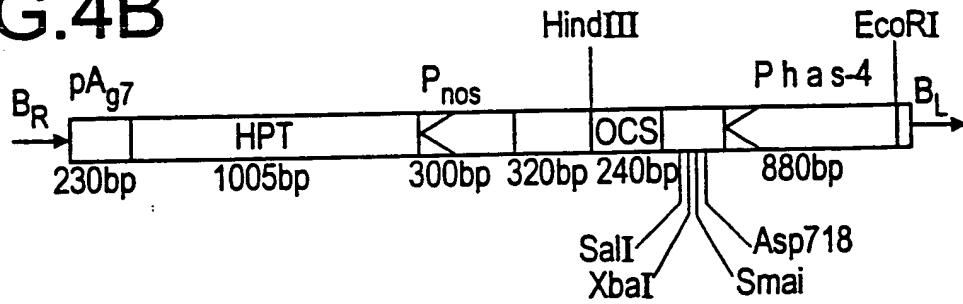
200 bp



[4/7]

FIG. 4

[Fig. 4/7]

FIG.4A**FIG.4B**

[5/7]

FIG. 5

[Fig. 5/7]

Primer combination**A****B**

9 9' 11 11' 9 9' 11 11'



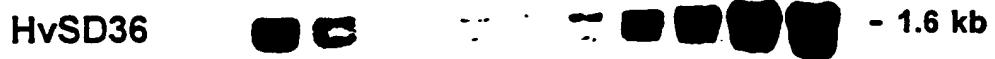
6/7

FIG. 6

[Fig. 6/7]

A. Model B. Field

9 10 11 12 29.5. → 21.6.



0050/48.

7/7

卷之三

FIG. 7

[Fig. 7/7]

B E H X



FIG. 8

